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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,326	10/29/2003	Xun Zhang	064441.0266	6553

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 10/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/696,326

Applicant(s)

ZHANG ET AL.

Examiner

Stephen Rosasco

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

In response to the comments of 9/02/05 the examiner withdraws the prior office action rejection and includes new rejections here including newly cited art.

Remarks – The applicant argued that the previously cited art to Hoke et al. was non-analogous art. The newly cited art to Pellegrino is in the area of vacuum, light transmitting devices.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Storm (6,103,427) in view of Pellegrino et al. (5,216,250).

The claimed invention is directed to a photomask assembly and a method of protecting a photomask, the photomask assembly comprising: a pellicle assembly including a pellicle frame and a pellicle film coupled to a first surface of the pellicle frame, the pellicle frame including an inner wall and an outer wall; a photomask coupled to a second surface of the pellicle frame opposite the pellicle film; and a molecular sieve associated with the pellicle assembly, the molecular sieve operable to prevent airborne molecular contaminants (AMCs) generated during a lithography process from contaminating the photomask, and formed of a catalytic material operable to decompose the AMCs into smaller particles.

And further comprising the molecular sieve formed on an inner wall of the pellicle frame and formed of a surface adsorption material operable to absorb the AMCs without generating

Art Unit: 1756

other contaminants, selected from the group consisting of metals, metal salts, metal oxides, composite compounds, polymers and organic compounds; wherein the pores comprise a size between approximately five Angstroms and approximately two-hundred Angstroms and including the high surface area material selected from the group consisting of high purity silica zeolite, sol-gel silica and macro reticulate polymers.

The applicant discusses the limitations of the prior art in that the semiconductor industry currently implements many techniques to protect photomask assemblies and photomask manufacturing tools from fine particles that have sizes in the microns. AMCs, however, may have sizes in the Angstroms and the conventional techniques may not be effective for eliminating contamination. For example, a conventional particulate filter may have a pore diameter of approximately 0.3 microns that allows AMCs, which may be as small as ten Angstroms, to pass through the filter into the photomask assembly or lithography tool.

[0008] One conventional technique used to remove particulates includes a chemical filter placed in a pellicle frame. The material forming the chemical filter may bind with the particulate matter in a chemical reaction to form a new composition. The new composition, however, may become another source of contamination. Additionally, the chemical filter may reach a saturation limit and stop reacting with the particulate matter, at which point the chemical filter no longer prevents the particulate matter from contaminating the lithography tools.

[0009] Vent holes formed in the pellicle frame may also be an access point for particulate matter and AMCs to enter the area between the pellicle film and the photomask. Conventional techniques of preventing particles from passing through the vent hole include adding filter sheets in the vent hold to block contaminants from entering the space under the pellicle film. Typically,

Art Unit: 1756

these filter sheets have pore sizes that block particulates in the range of approximately 0.5 μm or greater and molecular contaminants in the range of approximately 0.02 μm or greater. Thus, molecular contaminants that are smaller than 0.02 μm may pass through the conventional filter.

Storm teaches a pattern mask pellicle comprising: a transparent film extending across the top peripheral surface of a frame; and

a peripheral gasket adhered to the bottom peripheral surface of the frame and the frame and gasket assembly including a pressure relieving particle contamination means consisting of one tacky, continuous, tortuous path connecting an opening in the interior wall of the assembly with an opening in the exterior wall of the assembly.

And wherein the path and openings comprise a continuous, tortuous groove or slot in the gasket.

And wherein the path and openings comprise a continuous tortuous groove in the bottom peripheral surface of the frame.

The teachings of Storm differ from those of the applicant in that the applicant teaches the use of a molecular sieve associated with the pellicle assembly, the molecular sieve operable to prevent airborne molecular contaminants (AMCs) generated during a lithography process from contaminating the photomask, and formed of a catalytic material operable to decompose the AMCs into smaller particles.

Pellegrino et al. teach a digital imaging charge coupled device or CCD camera has a hollow camera body defining a sealable interior focal plane chamber enclosing a CCD array positioned to receive light focused thereon through a light-transparent window.

Art Unit: 1756

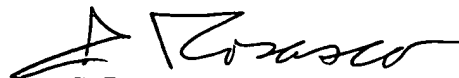
The interior chamber also encloses a molecular sieve moisture adsorber of crystalline alumino-silicate material, and the chamber is evacuated, filled with inert nitrogen gas under slightly elevated pressure and then sealed, minimizing the partial pressures of water vapor or outgassing gases and reducing or eliminating their effects on the CCD array.

It would have been obvious to one having ordinary skill in the art to take the teachings of Storm and combine them with the teachings of Pellegrino et al. in order to make the claimed invention because the use of molecular sieve for adsorbing AMCs is well known in any art which requires a gas vacuum or pressure differential across a membrane to be maintained, or requires the residual air environment to be free of these contaminants and they are known to be used in vacuum packages for detectors and cameras where gettering is necessary and light is to transverse an optical medium.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
10/18/05